nearly or quite two feet; the body is short and thick, the head triangular, half of it being covered by shields; the colour is earthy brown, with dark brown circular markings or spots; the belly is black, but the edges of the abdominal plates are whitish. The same snake has been observed in Japan, Formosa, Mongolia, Chihli, Sze-chuan, and Kiang-hsi. It is much dreaded by the Chinese, who give it several fanciful names; but its correct name is compounded of two ideographs meaning "worm" and "to strike," from the idea that it invariably inflicts two wounds. It derives one of its names ("only a day") from the notion that a person bitten by it lives only twenty-four hours. According to Kæmpfer, soldiers are fond of the flesh, and to this day it is highly esteemed as a febrifuge, and takes an important position in the Japanese pharmacopœia. The skin also is preserved as a talisman of singular efficacy. The popular belief is that the *mamushi* gives birth to its young through the mouth, but it is really oviviparous. It is said by one native encyclopædia that if the flesh be thrown on the ground the earth in the vicinity begins to hiss and steam, that the fat eats holes into everything it touches, that it is covered with bristles like a pig, is seven or eight feet long, carries a sting in its tail, and finally, that it should be eaten with "plum vinegar," or the leaves of the water-pepper. Taken thus, it cures irregular circulation of the blood and stubborn ulcers. The bite is seldom fatal, but when it is so, death occurs from circulation in the pulmonary arteries, producing asphyxia. As is the case with all *Crotalidæ* bites—for the *mamushi* is allied to the American rattlesnake, though far less venomous—the young can inflict poisonous wounds immediately after birth. The poison canal runs directly through the fang, while with many other snakes it simply lies in the groove of the fang. This tooth, or fang, may be compared with the needle of a hypodermic syringe; under the microscope it is flat, elliptic, sharp-pointed, and curved inward. In treating the wound, external applications are useless. In eating, the *mamushi* does not make use of its poison fangs, refusing even to eat anything that is killed with its venom. It is a reptile of nocturnal habits.

THE additions to the Zoological Society's Gardens during the past week include two Macaque Monkeys (*Macacus cynomolgus* ♂ ♀) from India, presented by Mr. A. J. McEwens, a Campbell's Monkey (*Cercopithecus campbelli* ♀) from West Africa, presented by Miss Lyster; a Wild Boar (*Sus scrofa* ♀), European, presented by the Rev. Horace Waller; an Emu (*Dromæus novæ-hollandiæ*) from Australia, presented by Capt. J. E. Erskine, R.N.; two Gouldian Grass Finches (*Poephila gouldiæ*) from Australia, presented by Mr. Chas. N. Rosenfeld, two Turtle Doves (*Turtur communis*), British, presented by Miss Reinhold; a Common Badger (*Meles taxus*), British, a Toco Toucan (*Ramphastos toco*), two Guira Cuckoos (*Guira piririgua*), a Brazilian Caracara (*Polyborus brasiliensis*) from Brazil, a Short-tailed Albatross (*Diomedea brachyura*) from Antarctic Seas, four Pintails (*Dafila acuta* ♂ ♂ ♀ ♀), European, four Summer Ducks (*Œx sponsa* ♂ ♂ ♀ ♀) from North America, two Spotted-billed Ducks (*Anas pœcilorhyncha* ♂ ♀) from India, deposited; two Summer Ducks (*Œx sponsa* ♂ ♀) from North America, four Mandarin Ducks (*Œx galericulata* ♂ ♂ ♀ ♀) from China, a Swinhoe's Pheasant (*Euplocamus swinhoii* ♂) from Formosa, a Common Spoonbill (*Platalea leucorodia*), European, purchased; three Black Swans (*Cygnus atratus*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN

HALLEY'S COMET IN 1456.—"This comet cannot exhibit a greater degree of brightness than when it passes the perihelion in the month of June; it may then be observed some days before perihelion; it is visible at perihelion itself, and, when it has passed that point, it continues to approach the earth, and its brightness consequently increases for some days." In these terms Pingré introduces his account of the appearance of Halley's comet in 1456, when, from the vague notices in the European chronicles which were available to him, he fixed the perihelion passage on June 8 at 22h. 10m. Paris mean time. The comet was observed in China on the morning of May 27.

A recent discovery of contemporary documents has led to our being put in possession of a much closer approximation to the elements of the orbit of Halley's comet at this return than it was possible to deduce from the published records of European historians and the Chinese description of its track given by Edouard Biot in the *Connaissance des Temps* for 1846. Prof. Uzielli a few years since found in the National Library at Florence a manuscript of Paolo dal Pozzo Toscanelli, with a chart upon which the positions of the comet and neighbouring stars are shown between June 8 and July 8, of which he forwarded a *fac-simile* to Prof. Celoria of the Royal Observatory at Milan, who has utilised it for the determination of the comet's orbit. There are in all, positions on twenty-four days. Prof. Celoria first compared the places of twenty-one stars read off from the chart, with their places reduced from modern positions to 1456·5, and found a mean correction of + 26′ to Toscanelli's longitudes and + 24′ to his latitudes—a rather surprising agreement for that epoch. Whether Toscanelli obtained his places from the catalogue of the Almagest, from that of Ulug Beigh, or some Arabian catalogue that had reached him, does not appear. The corrections named were applied to Toscanelli's positions of the comet, and, assuming the semi-axis major to have been 17·9676 (this value corresponding to the mean period between 1378 and 1835), Celoria obtains a first set of elements, which are used in the formation of normal places and differential equations, the solution of which leads him to the following most probable elements of the comet's orbit, depending on Toscanelli's observations:—

Perihelion passage 1456, June 8·20875, Paris M.T.

Longitude of perihelion	298° 56′ 47″	Equinox of 1456·5
,, ascending node ...	43 46 4	
Inclination	17 37 27	
Log. excentricity	9·98580	
Log. perihelion distance	9·76363	

Motion—retrograde.

On May 26·266 Paris M.T., about which time the comet was detected in China, the above elements give its position in R.A. 35° 43′, Decl. +23° 53′, distance from the earth 1·140, and from the sun 0·646. On June 17·333, in R.A. 106°·5, Decl. + 40°·7, it was at its least distance from the earth (0·446), and having then passed the perihelion about nine days, it was doubtless near this time that the comet created so much alarm by its brilliancy and magnitude. On July 8·339, when it was last observed by Toscanelli, its position was in R.A. 166° 34′, Decl. + 7°·0′, distance from the earth, 1·051, and from the sun 0·865.

The latest translation of the Chinese description of the track of the comet will be found in Williams's well-known volume, p. 77.

In addition to the observations of Halley's comet, Toscanelli's manuscripts supply observations of the comets of 1433, 1449, 1457 (I. and II.), and 1472, and Prof. Celoria has published elements deduced therefrom of all, except that of 1472, in the *Astronomische Nachrichten*. It appears beyond question, to use Prof. Celoria's own words, "Che le osservazioni in esso contenute sono assai preziose, danno a Toscanelli il vanto di avere prima d'ogni altro fatte intorno alle comete osservazioni propriamente dette, e rivelano in lui un osservatore abile non che una conoscenza sicura ed intera del cielo."

Irving represents Toscanelli as the correspondent and adviser of Columbus. Montucla's account of him chiefly relates to his erection of the gnomon in the Church of S. Maria del Fiore, at Florence, of which Ximenes published an account in 1757, wherein Montucla thought he claimed for Toscanelli more than was his due. As, however, Prof. Uzielli is engaged on researches respecting him, we may soon be more fully informed as to the works of one who certainly claims an honourable place in the history of observational astronomy.

THE TOTAL SOLAR ECLIPSE ON SEPTEMBER 9.—It may be remembered that during totality in the eclipse of December 22, 1870, the planet Saturn was situate within the coronal limits, but we are not sure that it was anywhere distinctly remarked. At the time of totality in the eclipse of September next in New

Zealand the planet Jupiter will be similarly situated. Thus at the middle of the eclipse at Castle Point, on the south-east coast of the North Island, the distance of Jupiter from the moon's limb will be 45′, and the angle of position from her centre about 26°.

There appears to be every probability that an expedition from the Australian observatories will take part in the observation of the eclipse on the shores of Cook's Straits, or in the vicinity of Castle Point.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, APRIL 26 TO MAY 2

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on April 26

Sun rises, 4h. 44m.; souths, 11h. 57m. 39·4s.; sets, 19h. 13m.; decl. on meridian, 13° 39′ N.: Sidereal Time at Sunset, 9h. 33m.

Moon (Full on April 29) rises, 16h. 16m.; souths, 22h. 14m.; sets, 4h. 1m.*; decl. on meridian, 3° 15′ S.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian ° ′
Mercury ...	4 39	12 6	19 33	15 45 N.
Venus ...	4 45	11 51	18 57	12 0 N.
Mars ...	4 18	10 59	17 40	7 26 N.
Jupiter ...	12 17	19 34	2 51*	14 1 N.
Saturn ...	6 56	15 3	23 10	22 7 N.

* Indicates that the setting is that of the following day.

Occultations of Stars by the Moon

April	Star	Mag.	Disap. h. m.	Reap. h. m.	Corresponding angles from vertex to right for inverted image ° °
26 ...	B.A.C. 4255 ...	6½ ...	20 28 ...	21 39 ...	66 219
30 ...	*o′* Libræ ...	... 6 ...	3 46 ..	4 55 ...	92 310
May 2 ...	29 Ophiuchi ...	6 ...	3 14 ...	4 22 ...	62 321

Phenomena of Jupiter's Satellites

April	h. m.		May	h. m.	
26 ...	20 59	II. ecl. reap.	1 ...	23 5	II. tr. ing.
27 ...	20 35	IV. ecl. reap.	2 ...	2 1	II. tr. egr.
28 ...	0 11	I. occ. disap.		20 3	III. tr. ing.
	21 31	I. tr. ing.		23 43	III. tr. egr.
	23 51	I. tr. egr.			
29 ...	22 8	I. ecl. reap.			

The Occultations of Stars and Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

April	h.	
28 ...	3 ...	Mercury in inferior conjunction with the Sun.
28 ...	19 ...	Mercury in conjunction with and 1° 42′ north of Venus.

GEOGRAPHICAL NOTES

THE Arctic steamer *Alert*, which is about to be returned by the Government of the United States to that of Great Britain, has been lent by the latter to Canada for the continuance of the Hudson's Bay Survey, for which purpose thirty thousand dollars will be asked from the Dominion Parliament.

AT the last meeting of the Geographical Society of Munich Dr. Clauss described his journey in South America, exploring the water-shed between the Paraguay and the Amazon. His companions were the brothers Von den Steinen. Thay ascended the Paraguay by steamer, and after eighteen days' journey reached Cuyaba, the capital of the Brazilian province of Matto Grosso, and the terminus of the steamship line on the river. Here they got a military escort and provisions. After remaining eight weeks in Cuyaba they started, with three months' provisions and an escort of fifteen men, to cross the water shed to the Amazon. This elevation, which is only 300 to 400 metres in height, presents the appearance of a savannah, broken up by forests, which follow the watercourses. The formation is sandstone, covered with a reddish clay, containing lumps of iron-ore. The nights on this plateau were very cold. The water-sheds between the various tributaries of the Amazon here were unknown. Brazilian geographers direct the whole upper course of the Xingu to the Tapajos, and put the source of the former under 11° south latitude. After the expedition had crossed the last tributary of the Tapajos, they reached, after eight days' journey, to the east, a large river. Here the oxen which remained healthy were killed, canoes were made from the bark of the Yatoba tree, and, after they had learnt that no larger river existed farther east, they began their voyage on the river, which, in honour of the governor of the province, was called Rio Batovy. The course is interrupted by numerous falls and rapids. In passing these obstacles the boats frequently capsized, and many valuable portions of the collections were lost. After a long and difficult voyage the party reached some Bacairi villages, the inhabitants of which were found wholly ignorant of metals. Through the Rio Batovy they reached a large river, undoubtedly the Xingu. Here they had a collision, which ended satisfactorily, with the Trumai Indians; subsequently they came in friendly contact with the Suya, from whom they received much important information about the hydrography of the region. At 9° south latitude waterfalls were again reached, which rendered navigation difficult, although the river was here a kilometre in width. When their provisions were almost wholly exhausted they reached the settlements of the Yuruna Indians, who understood Portuguese, and received further supplies from them. From 8° to 3° S. the Xingu falls 200 metres in a series of cataracts. Under the guidance of the Yurunas these rapids were passed, and on October 15 the first Portuguese settlement was reached, and the travellers took steamer on the Amazon to Para, which they reached after five months spent in the most unknown regions of Brazil.

THE Vienna correspondent of the *Times* states that an extraordinary meeting of the Geographical Society of Vienna will shortly be held to welcome the Austrian African explorers, Dr. Paulitschke and Dr. von Hardegger. The Crown Prince of Austria will be present. The travellers started from Trieste on December 30, 1884, and chiefly explored the interior of the Gallas country. At Harrar, the largest town of East Africa, they were amicably received by the Egyptian governor, Abdallah, son of the Emir Mahomed Abdel Shakur, murdered in 1875. The Governor was just engaged in forming an army. On their return, on March 25, they found Zeila half in ruins. The Austrian explorers have established meteorological stations at Harrar and Zeila, which will be looked after by the English Consuls, Pitten and King. The collections they have brought with them, filling several cases, will constitute a very valuable addition to the Austrian Imperial Museum. The travellers will, in a few days, report personally to the Crown Prince, and submit a comprehensive statement of the commercial conditions of East Africa to the Minister of Commerce.

A PARLIAMENTARY paper (Corea, No. 2, 1885) issued during the past week contains a report by Mr. Carles, of the British Consulate at Seoul, of a journey made by him at the close of last year through Northern Corea. The journey lasted about six weeks, and appears to have extended over about 3000 *li*. Starting from Seoul, Mr. Carles went along the western coast road through Kaisong, Hwang-ju, Phyong Yang and An-ju to Wy-ju, where the river forming the boundary between China and Corea was reached. Having ascended the valley of this river several days' journey, he turned towards the east coast through Kang-ge and Ham-heung, to the treaty port of Gensan on the Sea of Japan, from whence it is about a week's journey back to the capital. Among the points noticeable in this excellent report, extending to thirty-two octavo pages, we observe that in Corea, as in a lesser degree in Japan, there is a great disproportion between the number of males and females, the former being more numerous. In the large towns this is ascribed to the immense staffs attached to the officials, but in the villages there is no corresponding balance in favour of females, and it is probable that an explanation which accounts for the disproportion by a greater number of deaths among girls in infancy is correct, for there was no evidence of female infanticide. Corea has been said to be a land of large hats, but this does not tell everything, One would hardly expect the following dimensions from this statement alone. At Phyong Yang, a large and historical town near the west coast, Mr. Carles records that the hats worn by the poor women are baskets 3⅓ feet long, 2½ feet wide, and 2½ feet deep, which conceal their faces as effectually as the white cloak worn by women of a better class over their heads. The men wear a basket of the same shape, but somewhat smaller. It, however, requires the use of both hands to keep it in place. A structure of a size but little larger, which is used to cover fishing-boats, suggests to the traveller that the women's hats